AF/2853

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPELLANTS:	Hetzer et al.	CONFIRMATION NO. 6272
SERIAL NO.:	09/911,811	GROUP ART UNIT: 2853
FILED:	July 24, 2001	EXAMINER: Leonard S. Liang
TITLE:	"ARRANGEMENT AND METHOD FOR DATA FOLLOW UP FOR WARMUP CYCLES OF INK JET PRINT HEADS"	

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APPELLANTS' MAIN BRIEF ON APPEAL

S I R:

In accordance with the provisions of 37 C.F.R. §1.192(a), Appellants herewith submit their main brief in support of the appeal of the above-referenced application.

REAL PARTY IN INTEREST:

The real party in interest is Francotyp-Postalia AG & Co. KG, a German corporation, the assignee of the present application.

RELATED APPEALS AND INTERFERENCES:

There are no related appeals and no related interferences.

STATUS OF CLAIMS:

The application was filed with 23 original claims, and claim 24 was added during prosecution. Claim 24 has been cancelled in an Amendment filed simultaneously herewith, and therefore claims 1-3 are now the subject of the present appeal.

STATUS OF AMENDMENTS:

No Amendment was filed between the final rejection and the filing of the Notice of Appeal. An Amendment is filed simultaneously herewith cancelling claim

24, because Appellants have determined that the subject matter of claim 24 is already set forth in claim 10, and claim 24 therefore is redundant. Entry of this Amendment should be non-controversial, since it does not raise any new issues requiring further searching or consideration, and reduces the issues for consideration on appeal. The status of this Amendment is not known to the Appellants at the time the present Brief is being filed, however, Appellants will assume that the Amendment will be entered and will address only claims 1-23 in the present Brief.

SUMMARY OF THE INVENTION:

The subject matter of the claims on appeal concerns a method and an arrangement for data follow-up in the warm-up cycle of an ink jet printhead, allowing lower ink consumption, a faster operational readiness, and a satisfactory print quality. In general, the arrangement and method, which are the subject of the claims on appeal, make use of data representing at least one predetermined condition that are stored. The predetermined condition can be temperature-related conditions, history-related conditions and user-related conditions. A sensor measures ambient temperature, and a measurement also is made of the temperature of the ink jet printhead. A control unit determines a warm-up data for a fast start for a current warm-up cycle dependent on the ambient temperature and dependent on the (at least one) predetermined condition.

Figure 1 shows a perspective view of a postage meter machine 1 opened at the top. The postage meter machine 1 has a slot-shaped opening 3 in its housing 4. The transport direction for a supplied piece of mail (not shown) is identified by an arrow and proceeds from the upper left to the bottom right. Given further transport, the piece of mail comes to lie against a guide plate 2 of the postage meter machine

1. The housing 4 opened at the top shows two ½ inch ink jet print heads positioned in printing position. (p. 9, l.15-21)

Each print head has its own data memory and ink store and is therefore also referred to as an ink cartridge. An ink storage container holds approximately 40 ml of ink. The connection side of the ½ inch ink cartridges 21, 22 is fashioned in a specific, predetermined way. For electronic signal conversion and electromechanical connection, corresponding control and contacting units 211 and 221 are adapted to the connection side of the ½ inch ink cartridges 21, 22, respectively. (p.9, l.22 - p.10, l.4)

Figure 2 shows an ink cartridge 21 that has an electronic semiconductor chip 2100 in a head that is connected to a neck 2103. The head has a nozzle plate 2104 in the ejection direction and — orthogonally thereto — a parallel interface with an electrical contacting unit 2105 for the drive of the ink jet print head. (p. 10, l.5-8) The ink cartridge 21 has a belly-shaped ink reservoir 2106 as an ink store and — lying opposite thereto — an electronic memory chip 210 for storing warmup data of the ink jet print head 21 with electrical contacts 2107 for interrogating the warmup data, the filling level data and other data. (p.10, l.9-13) The latter data include a manufacturer identification number on the basis of which the control unit of the printer device can check whether a valid ink cartridge 21 has been installed. (p.9, l.13-15) A mechanical projection 2108 prevents insertion into the printer or device of ink cartridges that are not authorized by the manufacturer of the printer device. (p.9, l.15-17) The memory chip 210, the contacts 2107 and the projection 2108 are preferably combined in a structural unit and non-releasably secured (for example, by gluing) to the housing wall of the ink cartridge (at the neck or back). (p.9, l.17-19)

The electronic memory chip 210 for storing warmup data has a serial interface with the electrical contacts 2107 for the interrogation of data. (p.9, l.19-21) A control and contacting unit 211, which mates with the projection 2108 and the contacts 2107 is provided for electronic signal conversion and mechanical connection to the ½ inch ink cartridge. (p.9, l.21-23)

Figure 4 shows a block circuit diagram with a control and contacting unit 211 (pin drive unit) and the electronic control unit of the printer device. The control unit 14 of the printer device 1 has at least one microprocessor 140, user interfaces 142, 143, a memory 200, a serial interface 144 and a clock/date module 145. For example, the control unit 14 can be for a postage meter machine and also can contain a secure accounting device 141 for reckoning frankings. (p. 12, l.7-12) The control unit 14 is connected to the memory 200. Via a contacting unit 2117 of the control and contacting unit 211, the control unit 14 is connected to the contacting unit 2107 of the memory 210 via a serial interface 144. The memory 210 is, for example, an E^2PROM or similar non-volatile write/read memory. (p.12, l.12-16) The control and contacting unit 211 contains an application-specific integrated circuit (ASIC) 2111 and a temperature sensor 2119 for determining the ambient temperature. (p. 12, l.16-18) The ink jet print head temperature from the sensor 2109 and an 8-bit ink cartridge serial number from the read-only memory 2102 (ROM) can be interrogated via the contacting unit 2115 of a parallel interface of the ASIC 2111 of the control and contacting unit 211. (p. 12, l.18-21) This read-only memory 2102 supplies the 8-bit ink cartridge serial number to the contacting unit 2105 of the parallel interface of the semiconductor chip 2100 that is connected to the contacting unit 2115 of the parallel interface of the ASIC 2111. (p.12, l.21-24) The data stored in the memories

200 and 210 are called by the microprocessor 142 and the head temperature determined via the sensor 2109 is interrogated. (p.12, l24 - p.13, l.2) The ASIC 2111 of the control and contacting unit 211 receives serial signals that are now supplied by the control unit 14 of the printer device 1 so that these can be converted into parallel drive signals for the electronic semiconductor chip 2100. Controlled by the ASIC 2111, a voltage converter (DC/DC) 2112 generates the print voltage at the required amplitude. (p. 13, l.2-7)

Storage of warmup data under first conditions ensues, and second conditions are determined, and the appertaining warmup data are determined given current second conditions. (p. 13, l.17-19) The E^2PROM 210 arranged on the ink cartridge 21, 22 or a comparable non-volatile memory is provided for storing warmup data in a first memory area and the ink cartridge serial number in a second memory area, the latter being identical to the ink cartridge serial number stored in the memory ROM 2102. The microprocessor 140, for example, accesses the first memory area of the memory 200 or 210, with the warmup data using the ink cartridge serial number from the ROM 2102. (p.13, l.19-23) A manufacturer identification number of the manufacturer supplying the printer device 1 and ink cartridges 21, 22 can be present stored in the memories 200 or 210. (p.19, l.23 - p.14, l.3) The manufacturer identification numbers of all ink cartridges 21, 22 are identical. The authorization to employ the ink cartridges 21, 22 can be checked by the microprocessor 140 on the basis of the manufacturer identification number that is present stored in a memory area of the memory 140. (p.14, l.3-7) The form of the contacts 2107, the nature of the interface (serial) and the mechanical projection 2108 additionally limit the attempted use of ink cartridges of a different manufacturer without authorization.

The correctness of all code or numbers can, for example, be checked by a remote data center. (p. 14, l.7-10)

The storage of warmup data under first conditions ensues in a known way upon initial installation of the ink cartridge, and the check of the authenticity of the consumable (ink cartridge) can be triggered at the same time in a remote data center, namely on the basis of the manufacturer identification number and the 8-bit ink cartridge serial number or, alternatively, on the basis of a code word read out from the memory 210 by comparison to a reference code word stored in a remote data center. (p.14, l. 16-22) The code word can also be formed by encryption of serial and identification numbers or is merely allocated to the serial number. Although the communication with the remote data center can be tapped into, it cannot be interpreted in order to generate counterfeit ink cartridges with a true ink cartridge serial number and manufacturer identification number. (p. 16, l22 - p.17, l.2)

On the basis of Figure 5, which shows a temperature/voltage diagram, the determination of the warmup data under first conditions given initial installation of the ink cartridge shall now be explained. A precondition is that the ambient temperature ‘$_U$ measured by the control and contacting units 211, 221 (pin driver unit) lies in the optimum range, and that, after calibration has ensued, the head temperature ‘$_K$ can be measured by a temperature sensor of the print head. (p. 15, l. 3-8) Given ½ inch ink jet cartridges, for example, 22 temperature values of the print head are measured after turn-on, these belonging to respectively predetermined print pulse voltage values. Each nozzle is driven a thousand times with a pulse voltage of ≥ 12 V given an approximately 2 μs pulse width. (p. 15, l.8-12) The print pulse voltage value is

reduced in steps before every further measurement. The measured temperature curve is interpreted by seeking the local minimum of the temperature curve. (p.15, l.12-14) The appertaining print pulse voltage $U_P(\vartheta_{Kmin})$ is multiplied by a factor of 1.3. The optimum print pulse voltage value that derives is employed for the printing and for the warmup. During warmup, however, the pulse width is reduced to approximately 0.75 µs. (p.15, l.14-17) The optimum print pulse voltage value and the measured voltage temperature curve are non-volatilely stored. In the aforementioned example, one temperature/voltage curve is stored as 22 measured values in a first memory area upon new installation of an ink cartridge given a parameter (ambient temperature ϑ_U = 20°C). (p.15, l.17-21) The ink cartridge is automatically evaluated as new with a further parameter n_o if history-related data are not yet known. The equations

$$U_{Popt} = 1.3\ U_P(\vartheta_{Kmin}) \qquad (1)$$

$$U_{Popt} = F\{\vartheta_U, \vartheta_{Kmin}, n_o\} \qquad (2)$$

can be erected for the optimum print pulse voltage U_{Popt}, whereby the function F is determinant for the course of the curve. (p.15, l.21 - p.16, l.3) When other conditions prevail at the next activation (for example, ϑ_U = 25°C), a renewed measurement of a temperature/voltage curve can be inventively foregone since a U_{Popt} determination is undertaken instead by a data follow-up on the basis of the temperature/voltage curve. (p. 16, l.3-7)

There are two fundamental possibilities for a data follow-up:

a) empirically determined data for an optimum print pulse voltage U_{Popt} at different ambient temperatures '$_U$ referenced to first conditions n_o are stored in a table.

b) algorithm for calculating the optimum print pulse voltage U_{Popt} given different ambient temperatures $'_U$ referenced to first conditions n_o (see Equation (1)). (p. 16, l.8-13)

For a print head that is not new, second conditions are to be additionally determined as a combination of parameters that enable a history-related and user-related adaptation in that further tables are produced dependent on the parameter n_P, O_{user}. The second conditions (print head age, filling level) are expressed by the history-related parameter n_P. In the simplest case, there is one second table since a distinction is only made between new (parameter n_o) and old (parameter n_P). The user-related parameter O_{user} generates a further adaptation for what is still a fast operational readiness. (p. 17, l.6-13)

The flowchart for the data follow-up for warmup cycles of an ink jet print head proceeds from Figure 6. After the start step 100, the control unit 14 preferably reads (step 101) and checks (step 102) the identification number ID of the cartridge manufacturer. A branch is made to the step 104 given a permitted cartridge manufacturer. Otherwise, a branch is made back to the step 101 via step 103 to output an error message. The quality is thus assured since only the cartridges of a specific manufacturer are accepted. (p.17, l.18-24) A check is carried out in step 104 to determine whether a reinstallation of an ink cartridge should ensue. Ink cartridges that have already been used and replaced in the interim can also be reintroduced. Warmup data with parameter n_o, the first condition and, possibly, a code word are already stored for such a non-new ink cartridge. (p.17, l.24 - p.18, l.3) The control unit 14 has a security module 141 that is capable of forming a code (word) by encryption of serial number and manufacturer identification number. The

code word is stored in the respective memories, such as the memory 210 of the ink cartridges 21, 22. When a code word or the parameter n_o is stored, no reinstallation is undertaken and a branch is made to the step 111 in order to implement a data follow-up for a fast start in following steps. Up to 256 different serial numbers with allocated warmup data and parameters can be stored in a memory 200 of the postage meter machine. The need for memory space can be reduced the more data (code, serial number and allocated warmup data and parameters) there are that are stored in the respective memories of the ink cartridges themselves. (p.18, l.3-13)

When a new installation is to be undertaken, then the serial number is read first in the step 105 and the generation of a code that is allocated at least to the serial number potentially ensues. (p.18, l.14-16) After reading the serial number in step 105, a branch is made to step 106 in order to trigger the automatic communication of the code or of the serial number to the telepostage data center TDC. The communication alternatively can ensue later, for example given a communication for the purpose of a recrediting. An acquisition of the consumable that has been introduced and a check of the code of the serial number ensue in the TDC. (p. 18, l.16-21) The ink cartridge of the specific manufacturer with the serial number that has been read must in fact have been supplied to the user. Otherwise, measures for protection against pirated products can be undertaken. Given a new installation, the ambient temperature ϑ_U is measured and a curve for the head temperature $\vartheta_K = f\{U_P\}$ is determined in the step 107, the latter being a function of the print pulse voltage U_P applied to the heating elements. A minimum of the head temperature ϑ_{Kmin} lies in the range $12\ V \geq U_P ... \geq U_{Pmin}$. (p. 18, l.24 - p.19, l.4) The print pulse voltage U_P (ϑ_{Kmin}) that is allocated to the minimum is determined in step

108. The optimum print pulse voltage is then determined according to the aforementioned Equation (1) and stored in the first memory area of the memory 200 or 210. Storage of the serial number or the code and the first conditions n_o in the second memory area of the memory 200 or 210 ensues in step 109. In the following step 110, a first table for the optimum print pulse voltage is selected dependent on the parameters or generated according to Equation (2). (p.19, l.4-10)

From step 110, a branch is made via step 104 to step 111, where an interrogation is started as to whether second conditions were newly input. This would not be the case given a new installation, and branch is made to step 113, where an interrogation is started as to whether second conditions are present stored. (p. 19, l.11-14) When a parameter O_{user} to the effect that a fast operational readiness should be produced was input and stored user-related at a previous time, a branch is made to a step 114. (p.19, l.15-17) This is usually not the case given a new installation and a branch is made to step 116, where warmup data are stored allocated to the serial number of the ink cartridge. (p.19, l.17-19) A pre-heating with pulses having the duration t = 0.75 μs and an amplitude U_{Popt} can thus be undertaken in step 117. (p.19, l.19-20) The head temperature repeatedly measured in step 118 is monitored (steps 119, 120). If it is found in step 119 that a minimum of the optimum head temperature has not been downwardly transgressed, a check ensues in step 120 to determine whether a maximum of the optimum head temperature range has been exceeded. (p.19, l.20-24) If the head temperature lies within the optimum head temperature range, then the end (step 122) is reached. If, however, the head temperature lies below the optimum head temperature range, then $\vartheta_K > \vartheta_{Koptmin}$ is not true, and a branch is made back to the step 117 for the pre-

heating. (p.19, l.24 - p.20, l.4) The warmup pulses lead to a head temperature that rises in steps. Otherwise, an error message ensues (in step 121) if the check in step 120 shows that a maximum of the optimum head temperature range is exceeded (then, $\vartheta_K < \vartheta_{Koptmax}$ is not true). (p.20, l.4-7) The reduction of the warmup cycles occurs given a used ink cartridge. The invention has the advantage that the warmup cycles with ink spraying of a new installation can be avoided given ink cartridges that are not new. When a method for data follow-up is employed for the warmup cycles, the warmup data U_{Popt} and t = 0.75 μs stored in step 116 guarantee a warmup of the print head of a non-new ink cartridge in less than half the time, i.e. within a time of < 30 s. (p. 20, l.7-12)

ISSUES:

The following issues are the subject of the present appeal:

(1) Whether the subject matter of claims 1-4, 6-8, 10-17 and 20-22 is anticipated under 35 U.S.C. §102(b) by United States Patent No. 5,812,156 (Bullock et al.);

(2) Whether the subject matter of claims 5 and 9 would have been obvious to a person of ordinary skill in the art under the provisions of 35 U.S.C. §103(a) based on the teachings of Bullock et al. in view of the teachings of United States Patent No. 5,513,563 (Berson); and

(3) Whether the subject matter of claims 18, 19 and 23 would have been obvious to a person of ordinary skill in the art under the provisions of 35 U.S.C. §103(a) based on the teachings of Bullock et al. in view of the teachings of United States Patent No. 5,477,246 (Hirabayashi et al.).

GROUPING OF CLAIMS:

The patentability of claims 1-23 stands or falls together.

ARGUMENT:

In the Final Rejection, the Examiner stated that the Bullock et al. reference teaches "cartridge memory 28 and printhead memory 16 enable microprocessor 34 to calculate control values which enable printer 1 to maintain high quality print media output." The Examiner stated this teaching "demonstrates" warm-up data for a fast start for a current warm-up cycle as a means for the printer to maintain high quality print output. Appellants do not agree that the teaching cited by the Examiner "demonstrates" warm-up data, particularly in the absence of any mention or usage of warm-up data in the algorithm set forth in detail in the Bullock et al. reference. The absence of any discussion whatsoever of warm-up data in Bullock et al. is, by itself, sufficient to overcome the anticipation rejection based on Bullock et al.

Additionally, Appellants respectfully submit the Examiner is incorrect in contending that the Bullock et al. reference teaches a sensor for measurement of ambient temperature. In the substantiation of the rejection of claim 1, the Examiner cited language at column 4, lines 1-13 as substantiation for the Bullock et al. reference teaching a drive unit connected to an ink jet printhead for heating, measuring a temperature of, and driving the ink jet printhead. The Examiner also cited this same language (column 4, lines 4-6) as allegedly teaching a sensor for measurement of ambient temperature. The explicit language in this passage, however, states that a thermal sense sensor is positioned on the printhead and detects the temperature of the semiconductor substrate on which the heater resistors are positioned. This is clearly not an ambient temperature sensor, but is a sensor

used to at least indirectly measure the temperature of the printhead or the circuit board on which the heater resistors are mounted.

In Figure 4 of the present application, sensor 2109 is the sensor which allows the drive unit to measure the temperature of the ink jet printhead, and a separate temperature sensor, 2119 also shown in Figure 4, is provided for determining the ambient temperature. This is described in the paragraph beginning at page 12, line 7 of the present specification.

The fact that the thermal sense resistor (referred to as the TSR in the Bullock et al. reference) does not measure ambient temperature is further substantiated by the detailed description of the algorithm in column 6 of the Bullock et al. reference. In that algorithm, the value T is explicitly defined as the *printhead* temperature, and is stated to be calculated from a formula that relates the printhead temperature to the TSR output. It is further stated that the TSR is monitored by the system to "infer" head temperature. Therefore, if the TSR is not a direct measurement of the head temperature, it is a measurement of a temperature at a location very close to the printhead from which (presumably by having knowledge of the relevant thermal transfer coefficients) the head temperature can be calculated. In any event, it is clear that the output of the TSR is not and cannot be the ambient temperature, since there would be no accurate way to make a purely mathematical calculation of the temperature of the printhead by a measurement of ambient temperature. (Hence, the use of previously-obtained and stored predetermined condition in combination with the ambient temperature measurement in the subject matter of the present claims)

Aside from the absence of any disclosure of an ambient temperature sensor in the Bullock et al. reference, the described usage of the TSR in the Bullock et al. reference is evidence that the system described therein operates based on concepts that are completely different from the subject matter disclosed and claimed in the present application. The Bullock et al. reference operates by measuring, or calculating, the temperature of the printhead itself, and this value is used in the algorithm for operating the printhead. As noted above, there is no explicit teaching in the Bullock et al. reference that this operating algorithm proceeds any differently during warm-up than during normal usage. The subject matter of the claims on appeal rejects the conventional thinking of monitoring the temperature of the printhead itself for use as the primary regulating parameter, and instead monitors ambient temperature and uses the monitored ambient temperature, in combination with stored data, to regulate the temperature of the printhead during warm-up.

The above arguments were presented during prosecution in response to a first Office Action, which resulted in the final rejection. In the final rejection, the Examiner provided a response to these arguments, to which Appellants herewith respond.

With regard to the absence of any explicit discussion in the Bullock et al. reference regarding the generation or use of warm-up data, the Examiner stated at page 13 of the Office Action that "based on the teachings of Bullock et al., one of ordinary skill in the art would find the warm-up data and warm-up cycle inherent to the invention. The Examiner also stated that one of ordinary skill in the art would recognize that factory-written and printer-recorded data values, such as drop volume measurement, temperature sense resistor calibration data, and firing energy

parameters represent information that is essential to the initiation (warm-up) of a printer. (Appellants assume the Examiner intended to refer to "initialization" rather than "initiation.")

As the Court of Appeals for the Federal Circuit has stated many times, however, in order to support an inherency argument, it must be established that the information in question is *necessarily* present in the context of the reference. Moreover, the Federal Circuit has held that if some sort of extrinsic evidence is relied upon to establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1267, 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991). If the various items noted above by the Examiner were intended to relate to, or represent, warm-up data, nothing could have been simpler than to actually use the term "warm-up data." Appellants respectfully submit that the complete absence of any mention whatsoever of the term "warm-up data" is evidence that the generation or use of warm-up data is not necessary present in the Bullock et al. reference, and therefore such a disclosure is not inherent in that reference.

The Examiner also contested Appellants' arguments regarding the absence of a disclosure in the Bullock et al. reference of a measurement of ambient temperature. The Examiner stated that the Appellants are attempting to read limitations from the specification into the claimed invention in order to improperly narrow the definition of the word "ambient." The Examiner stated that based on Appellants specification, the Examiner believes the Appellants are referring to "ambient" temperature as the temperature of the environment, thereby distinguishing

that temperature from the "printhead" temperature. The Examiner is correct in this statement, but the Examiner cited a dictionary definition of the word "ambient" to substantiate a broader definition than that asserted by the Appellants.

Appellants submit the Examiner is incorrectly and unjustifiably parsing the term "ambient temperature" by first looking for a definition of the word "ambient" and then applying that to the noun temperature. The two-word term "ambient temperature" has a well-understood meaning and Appellants are entitled to rely on that well-understood meaning, in the absence of any specifically restrictive meaning in the specification. The term "ambient temperature" has an ordinary meaning, as the Examiner noted, of meaning the temperature of the environment. Parsing this term by first defining "ambient" by itself, and then applying that definition to the word "temperature" is inconsistent with this commonly understood meaning. A comparable term is "atmospheric pressure," which has a well-understood meaning. That meaning would be distorted if the general definition of "atmospheric" were first ascertained, and then that definition was applied to the word "pressure."

Appellants respectfully submit it is sufficient for the Examiner and the Board to take official notice of this well-understood meaning of the term "ambient temperature." Nevertheless, Appellants have submitted herewith two technical dictionaries that provide evidence of this well-understood meaning. These dictionary excerpts are being submitted under separate cover with a Request under 37 C.F.R.§ 1.195, however, they are merely dictionary excerpts of the type commonly relied upon by the members of the Board on their own initiative. Even if entry of these dictionary excerpts as part of the "official" record is not permitted, Appellants submit

they are only cumulative evidence of the well-understood meaning of the term "ambient temperature."

When the term "ambient temperature" is given its generally understood meaning in the claims of the present application, it is clear, for the reasons discussed above, that the Bullock et al. reference does not provide any sensor which measures "ambient temperature."

Moreover, dependent claim 10 explicitly claims that the drive unit has a sensor for measuring the temperature of the ink jet printhead. The sensor for measuring the temperature of the ink jet printhead in claim 10 must necessarily be a different sensor from the sensor that measures ambient temperature in independent claim 1, from which claim 10 depends, otherwise this portion of claim 10 would be duplicative and redundant. The Examiner's interpretation of claim 1 for the purpose of applying the Bullock et al. reference against claim 1 effectively reads claim 10 out of the application, which the Examiner is not permitted to do.

The Bullock et al. reference, therefore, does not disclose all of the elements of the arrangement of independent claim 1, or all of the method steps of independent method claims 13 and 20, and therefore does not anticipate any of those claims. For the same reasons, the Bullock et al. reference does not anticipate any of the claims respectively depending from those independent claims. Therefore, none of claims 1-4, 6-8, 10-17 or 20-22 is anticipated by the Bullock et al. reference.

Claims 5 and 9 were rejected under 35 U.S.C. §103(a) as being unpatentable over Bullock et al. in view of Berson. Claims 18, 19 and 23 were rejected under 35 U.S.C. §103(a) as being unpatentable over Bullock et al. in view of Hirabayashi et al. For the reasons discussed above with respect to the Bullock et al. reference, even if

the Examiner is correct regarding the teachings of Berson and Hirabayashi et al., modifying the Bullock et al. system in accordance with those teachings still would not result in an arrangement of an apparatus as set forth the aforementioned dependent claims, since they respectively include the subject matter of the aforementioned independent claims. Moreover, neither the Berson nor the Hirabayashi et al. reference has anything whatsoever to do with regulating the warm-up cycle of an ink jet printhead, and therefore Appellants submit that a person of ordinary skill in the art would find no teaching, motivation or inducement in any of these references to modify the Bullock et al. reference for the purpose of assisting in the warm-up of an ink jet printhead. Appellants respectfully submit that after reading the present disclosure, the Examiner has located independent teachings in the prior art relating to certain of the dependent claims, but those teachings have no relevance whatsoever to regulating the warm-up of an ink jet printhead, and a person of ordinary skill in the art, who has not had the benefit of first reading the present disclosure, would find no reason to consult the Berson or Hirabayashi et al. references as a basis for solving problems in that field.

CONCLUSION:

For the foregoing reasons, Appellants respectfully submit that the rejections of claims 1-23 are in error in fact and in law. Reversal of these rejections is therefore respectfully requested.

This Appeal Brief is accompanied by a check for the requisite fee in the amount of $330.00.

Submitted by,

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CERTIFICATE OF MAILING

I hereby certify that an original and two copies of this correspondence are being deposited with the United States Postal Service as First Class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on December 18, 2003.

Steven H. Noll

STEVEN H. NOLL

APPENDIX "A"

1. An arrangement for data follow-up for a warmup cycle of an ink jet printhead, said arrangement comprising:

an ink cartridge having an ink jet printhead and a drive unit connected to the ink jet printhead for heating, measuring a temperature of, and driving the ink jet printhead;

a control unit connected to the drive unit for controlling the drive unit;

a memory accessible by said control unit having a first memory area in which warmup data are stored in re-writable fashion, and a second memory area in which data representing at least one predetermined condition are stored, said at least one predetermined condition being selected from the group consisting of temperature-related conditions, history-related conditions and user-related conditions;

a sensor connected to said drive unit for measurement of ambient temperature; and

said control unit being programmed to implement at least one measurement of said ambient temperature with said sensor, and to determine warmup data for a fast start for a current warmup cycle dependent upon said ambient temperature and dependent on said at least one predetermined condition.

2. An arrangement as claimed in Claim 1, said memory is a first memory, and wherein said arrangement comprises:

a second memory disposed on said ink cartridge, and which identification data uniquely identifying said ink cartridge, and data representing further predetermined conditions, are store, and wherein said warmup data stored in said first memory are allocated to said identification data.

3. An arrangement as claimed in Claim 2 wherein said ink cartridge has a serial number uniquely associated therewith, and wherein said identification data includes said serial number.

4. An arrangement as claimed in Claim 2 wherein said ink cartridge has a manufacturer identification number uniquely associated therewith, and wherein said identification data includes said manufacturer identification number.

5. An arrangement as claimed in Claim 2 wherein said ink cartridge has a serial number and a manufacturer identification number uniquely associated therewith, and wherein said control unit comprises a security module for forming a code word by encryption of said serial number and said manufacturer identification number, and wherein said control unit stores said code word in said second memory as at least a portion of said identification data.

6. An arrangement as claimed in Claim 1 wherein said memory is disposed on said ink cartridge and wherein said second memory area additionally contains identification data uniquely identifying said ink cartridge, and data representing further predetermined conditions allocated to said identification data, and where in said control unit is programmed to interrogate said memory to execute

said data follow-up employing said further predetermined conditions allocated to said identification data.

7. An arrangement as claimed in Claim 6 wherein said ink cartridge has a serial number uniquely associated therewith, and wherein said identification data includes said serial number.

8. An arrangement as claimed in Claim 6 wherein said ink cartridge has a manufacturer identification number uniquely associated therewith, and wherein said identification data includes said manufacturer identification number.

9. An arrangement as claimed in Claim 6 wherein said ink cartridge has a serial number and a manufacturer identification number uniquely associated therewith, and wherein said control unit comprises a security module for forming a code word by encryption of said serial number and said manufacturer identification number, and wherein said control unit stores said code word in said second memory as at least a portion of said identification data.

10. An arrangement as claimed in Claim 1 wherein said drive unit includes a sensor for measuring the temperature of the ink jet printhead, said sensor generating sensor data representing said temperature, and wherein said control unit is programmed to interrogate said sensor data via said drive unit for determining said warmup data.

11. An arrangement as claimed in Claim 1 comprising:

a user interface connected to said control unit for entering a user request for said fast start;

a communication link, connected to said control unit, to a remotely disposed telepostage data center which, upon receipt of said user request,

transmits a parameter for said fast start, including an identification of said user, to said control unit, and wherein said control unit is programmed to store said parameter in said memory and to employ said user related conditions, corresponding to the user identified by said parameter, for determining said warmup data for said fast start.

12. An arrangement as claimed in Claim 1 further comprising a date clock module connected to said control unit for generating history-related data as said history-related conditions .

13. A method for determining data for a warmup cycle of an ink jet printhead before operating said ink jet printhead comprising the steps of:

storing warmup data and data representing a first condition in a memory of an apparatus employing an ink jet printhead upon installation of an ink cartridge for said ink jet printhead in said apparatus, before a first use of said newly installed ink cartridge;

accumulating and storing parameter data for second conditions for a fast start of said ink jet print head during repeated use of said ink jet printhead; and

determining warmup data for said second conditions from said parameter data and employing said warmup data for said second conditions in at least one warmup cycle of said ink jet printhead.

14. A method as claimed in Claim 13 wherein the step of storing said parameter data comprises storing said parameter data in a table, and wherein the step of determining said warmup data comprises the electronically accessing said

table to retrieve said parameter data therefrom, and determining said warmup data from said retrieved data.

15. A method as claimed in Claim 14 wherein the step of determining said warmup data comprising determining said warmup data by applying a computational algorithm to said parameter data.

16. A method as claimed in Claim 13 wherein the step of accumulating and storing parameter data comprises accumulating and storing parameter data representing use of said ink cartridge, and wherein said second conditions comprise temperature-related data and history-related data, and wherein the step of determining said warmup data comprises determining said warmup data dependent on said parameter representing use, said temperature-related data and said history-related data.

17. A method as claimed as Claim 13 comprising the additional step of entering a user-selected parameter into said apparatus, and wherein said second conditions comprise temperature-related data and user-related data, and wherein the step of determining said warmup data comprises determining said warmup data from said parameter entered by said user, said temperature-related data and said user-related data.

18. A method as claimed in Claim 13 comprising the step of operating said ink jet printhead with a voltage pulse having a pulse amplitude and a pulse duration, and comprising modifying said pulse amplitude in said warmup cycle and maintaining said pulse duration at a constant value during said warmup cycle, said constant value being shorter than a pulse duration when operating said ink jet printhead for printing.

19. A method as claimed in Claim 13 wherein said second conditions include temperature-related data, history-related data and user-related data, and comprising the additional steps of operating said ink jet print head with a voltage pulse having a pulse amplitude and a pulse duration, and modifying said pulse amplitude during said warmup cycle dependent on said temperature-related data and said history-related data, and modifying said pulse duration during said warmup cycle dependent on said user-related data.

20. A method as claimed in Claim 13 comprising the steps of:

uniquely allocating identification data to said ink cartridge;

before each use of said ink cartridge, interrogating said identification data and checking said identification data to authenticate said identification data; and

determining said warmup data for said fast start according to a first procedure if said ink cartridge is authenticated and according to a second procedure if said ink cartridge is not authenticated.

21. A method as claimed in Claim 13 wherein said second conditions comprise data representing ambient temperature, data representing temperature of said ink jet print head, a first parameter dependent on use of said ink cartridge, and a user-entered second parameter indicating selection of a shortened warmup cycle.

22. A method as claimed in Claim 13 wherein said ink cartridge is a first ink cartridge, and comprising the additional steps of providing a second ink cartridge in said apparatus and determining different warmup data for said second ink cartridge, and operating said first ink cartridge in said warmup cycle with said warmup data and

operating said second ink cartridge ~~ink~~ in said warmup cycle with said different warmup data.

23. A method as claimed in Claim 22 comprising operating said first ink cartridge with a first voltage pulse having a pulse amplitude and a pulse duration, and operating said second ink cartridge with a second pulse having a pulse duration and a pulse amplitude, and comprising compensating for differences between said first ink cartridge and said second ink cartridge by modifying, in said warmup cycle , said pulse duration of one of said first pulse and said second pulse, while maintaining said pulse amplitude of said first pulse and said second pulse equal.

CH1\ 4079801.1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

REQUEST UNDER 37 C.F.R.§ 1.195 FOR ACCEPTANCE AND CONSIDERATION OF EXHIBITS ACCOMPANYING APPEAL BRIEF

APPELLANTS:	Hetzer et al.	CONFIRMATION NO. 6272
SERIAL NO.:	09/911,811	GROUP ART UNIT: 2853
FILED:	July 24, 2001	EXAMINER: Leonard S. Liang
TITLE:	"ARRANGEMENT AND METHOD FOR DATA FOLLOW UP FOR WARMUP CYCLES OF INK JET PRINT HEADS"	

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

S I R:

Attached hereto are excerpts from the McGraw-Hill Dictionary of Scientific and Technical Terms, Fifth Edition and the IEEE Standard Dictionary of Electrical and Electronics Terms, providing consistent definitions of the term "ambient temperature." These exhibits are submitted in substantiation of the meaning of this term advanced by the Appellants in the Appeal Brief filed simultaneously herewith, as well as in substantiation of Appellants' position that this two-word term in fact has a generally understood meaning.

These exhibits could not be presented earlier because it was not until receiving the final rejection that the Appellants were informed that the Examiner is not considering the term "ambient temperature" as a two-word phrase with a generally accepted meaning, but is defining "ambient" according to a general dictionary definition of that word, and then applying that definition to the noun "temperature." Until receiving the final rejection, Appellants were not informed that the Examiner was relying on this manner of defining the two-word phrase "ambient temperature."

Moreover, these technical dictionaries are resources of the type that the members of the Board of Patent Appeals and Interferences commonly rely on and cite in their opinions as a matter of course, regardless of whether they have been made "officially" of record during prosecution.

Acceptance and consideration of these dictionary excerpts is therefore justified, and the same is respectfully requested.

Submitted by,

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I hereby certify that an original and two copies of this correspondence are being deposited with the United States Postal Service as First Class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on December 18, 2003..

Steven H. Noll

STEVEN H. NOLL

McGraw-Hill Dictionary of Scientific and Technical Terms

Fifth Edition

Sybil P. Parker
Editor in Chief

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On the c ver: Photomicr graph f crystals f vitamin B_1.
(Dennis Kunkel, University of Hawaii)

In addition, material has been drawn from the following references: R. E. Huschke, *Glossary of Meteorology*, American Meteorological Society, 1959; *U.S. Air Force Glossary of Standardized Terms*, AF Manual 11-1, vol. 1, 1972; *Communications-Electronics Terminology*, AF Manual 11-1, vol. 3, 1970; W. H. Allen, ed., *Dictionary of Technical Terms for Aerospace Use*, 1st ed., National Aeronautics and Space Administration, 1965; J. M. Gilliland, *Solar-Terrestrial Physics: A Glossary of Terms and Abbreviations*, Royal Aircraft Establishment Technical Report 67158, 1967; *Glossary of Air Traffic Control Terms*, Federal Aviation Agency; *A Glossary of Range Terminology, White Sands Missile Range, New Mexico*, National Bureau of Standards, AD 467-424; *A DOD Glossary of Mapping, Charting and Geodetic Terms*, 1st ed., Department of Defense, 1967; P. W. Thrush, comp. and ed., *A Dictionary of Mining, Mineral, and Related Terms*, Bureau of Mines, 1968; *Nuclear Terms: A Glossary*, 2d ed., Atomic Energy Commission; F. Casey, ed., *Compilation of Terms in Information Sciences Technology*, Federal Council for Science and Technology, 1970; *Glossary of Stinfo Terminology*, Office of Aerospace Research, U.S. Air Force, 1963; *Naval Dictionary of Electronic, Technical, and Imperative Terms*, Bureau of Naval Personnel, 1962; *ADP Glossary*, Department of the Navy, NAVSO P-3097.

McGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS,
Fifth Edition

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cury. 2. To unite two dissimilar metals. 3. To cover the zinc elements of a galvanic battery with mercury. { ə'mal·gə,māt }

amalgamating table [MET] A sloping wooden table covered with a copper plate on which mercury is spread to amalgamate with precious-metal particles. { ə'mal·gə,mād·iŋ ,tā·bəl }

amalgamation [MET] Also known as amalgam treatment. 1. The process of separating metal from ore by alloying the metal with mercury; formerly used for gold and silver recovery, where it has been superseded by the cyanide process. 2. The formation of an alloy of a metal with mercury. { ə,mal·gə'mā·shən }

amalgamation pan [MET] A circular cast-iron pan in which gold or silver ore is ground and the precious metal particles are amalgamated with mercury added to the pan. { ə,mal·gə'mā·shən ,pan }

amalgamator [MET] A device for bringing pulverized ore into contact with mercury to form an amalgam from which the metal is subsequently recovered. { ə'mal·gə,mād·ər }

amalgam barrel [MET] A small batching mill used to grind auriferous concentrates with mercury. { ə'mal·gəm ,bar·əl }

amalgam retort [MET] A retort in which mercury is distilled off from gold, or silver amalgam is obtained in amalgamation. { ə'mal·gəm ri,tȯrt }

amalgam treatment *See* amalgamation. { ə'mal·gəm ,trēt·mənt }

Amalthea [ASTRON] The innermost known satellite of Jupiter, orbiting at a mean distance of 1.13×10^5 miles (1.82×10^5 kilometers); it has a diameter of about 150 miles (240 kilometers). Also known as Jupiter V. { ,äm·äl'thē·ə }

amantadine [PHARM] $C_{10}H_{17}N$ A symmetrical amine used as a viral chemoprophylactic because it selectively inhibits certain myxoviruses; also of value in the treatment of parkinsonism. { ə'man·tə,dēn }

amanthophilous [BOT] Of plants having a habitat in sandy plains or hills. { ,a·mən'thä·fə·ləs }

Amaranthaceae [BOT] The characteristic family of flowering plants in the order Caryophyllales; they have a syncarpous gynoecium, a monochlamydeous perianth that is more or less scarious, and mostly perfect flowers. { ,a·mə·rə'thā·sē,ē }

amarantite [MINERAL] $Fe(SO_4)(OH) \cdot 3H_2O$ An amaranth red to brownish- or orange-red triclinic mineral consisting of a hydrated basic sulfate of ferric iron. { ,a·mə'ran,tīt }

amarillite [MINERAL] $NaFe(SO_4)_2 \cdot 6H_2O$ A pale greenish-yellow mineral consisting of a hydrous sodium ferric sulfate. { ,a·mə'ri,līt }

Amaryllidaceae [BOT] The former designation for a family of plants now included in the Liliaceae. { ,a·mə,ri·lə'dā·sē,ē }

A-mast [ENG] An A-shaped arrangement of upright poles for supporting a mechanism designed to lift heavy loads. { 'ā ,mast }

amasthenic lens [OPTICS] A lens that refracts the rays of light into one focus. Also known as amacratic lens. { ¦ā·məs¦thēn·ik 'lenz }

amateur bands [COMMUN] Bands of frequencies assigned exclusively to licensed radio amateurs. { 'a·mə·chər ,banz }

amateur radio [ELECTR] A radio used for two-way radio communications by private individuals as leisure-time activity. Also known as ham radio. { 'a·mə·chər 'rād·ē,ō }

amathophobia [PSYCH] Abnormal fear of dust. { ə,math·ə'fō·bē·ə }

amatol [MATER] An explosive mixture composed of ammonium nitrate and trinitrotoluene; mixtures with 50% and 80% ammonium nitrate are used for small and large shells, respectively. { 'am·ə·tȯl }

amatoxin [BIOCHEM] Any of a group of toxic peptides that selectively inhibit ribonucleic acid polymerase in mammalian cells; produced by the mushroom *Amanita phalloides*. { ¦am·ə¦täk·sən }

amaurosis [MED] Total or partial blindness. { ,a,mȯ'rō·səs }

amaurotic familial idiocy [MED] A hereditary condition, transmitted as an autosomal recessive, predominantly in Jewish children, characterized by blindness, muscular weakness, and abnormal mental development; when the onset is in infancy, the disease is known commonly as Tay-Sachs disease. { ¦a·mȯ¦räd·ik fə'mil·yəl 'id·ē·ə·sē }

amazonite [MINERAL] An apple-green, bright-green, or blue-green variety of microcline found in the United States and Soviet Union; sometimes used as a gemstone. Also known as amazon stone. { ¦a·mə¦zō,nīt }

amazon stone *See* amazonite. { 'a·mə·zän ,stōn }

ambatoarinite [MINERAL] A mineral consisting of a carbonate of cerium metals and strontium. { ,am·bə,tō'ä·rə,nīt }

amber [MINERAL] A transparent yellow, orange, or reddish-brown fossil resin derived from a coniferous tree; used for ornamental purposes; it is amorphous, has a specific gravity of 1.05–1.10, and a hardness of 2–2.5 on Mohs scale. { 'am·bər }

amber codon [VIROL] The polypeptide chain-termination messenger-RNA codon UAG, which brings about the termination of protein translation. { 'am·bər 'kō,dän }

amber glass [MATER] A tinted glass made by using different mixtures of sulfur and iron oxide; the color can vary from pale yellow to ruby amber. { 'am·bər 'glas }

ambergris [PHYSIO] A fatty substance formed in the intestinal tract of the sperm whale; used in the manufacture of perfume. { 'am·bə,gris }

amberite [MATER] A smokeless powder composed of guncotton, barium nitrate, and paraffin. { 'am·bə,rīt }

amber mutation [GEN] Alteration of a codon to UAG, a codon that results in premature polypeptide chain termination in bacteria. { 'am·bər myü'tā·shən }

amberoid [MINERAL] A gem-quality mineral composed of small fragments of amber that have been reunited by heat or pressure. { 'am·bə,rȯid }

amber oil [MATER] 1. A yellowish to brown essential oil made by destructive distillation of amber; has an acrid taste. 2. A light essential oil prepared by destructive distillation of rosin. { 'am·bər ,ȯil }

ambident [ORG CHEM] Pertaining to a chemical species whose molecules possess two reactive sites. { 'am·bə·dənt }

ambidextrous [PHYSIO] Capable of using both hands with equal skill. { ¦am·bə¦dek·strəs }

ambient [ENG] Surrounding; especially, of or pertaining to the environment about a flying aircraft or other body but undisturbed or unaffected by it, as in ambient air or ambient temperature. { 'am·bē·ənt }

ambient light [OPTICS] The surrounding light, such as that reaching a television picture-tube screen from light sources in a room. { 'am·bē·ənt 'līt }

ambient noise [ACOUS] The pervasive noise associated with a given environment, being usually a composite of sounds from sources both near and distant. { 'am·bē·ənt 'nȯiz }

ambient pressure [FL MECH] The pressure of the surrounding medium, such as a gas or liquid, which comes into contact with an apparatus or with a reaction. { 'am·bē·ənt 'presh·ər }

ambient stress field [GEOPHYS] The distribution and numerical value of the stresses present in a rock environment prior to its disturbance by man. Also known as in-place stress field; primary stress field; residual stress field. { 'am·bē·ənt 'stres ,fēld }

ambient temperature [PHYS] The temperature of the surrounding medium, such as gas or liquid, which comes into contact with the apparatus. { 'am·bē·ənt 'tem·prə·chər }

ambigenous [BOT] Of a perianth whose outer leaves resemble the calyx while the inner leaves resemble the corolla. { ,am'bi·jən·əs }

ambiguity [ELECTR] The condition in which a synchro system or servosystem seeks more than one null position. [NAV] The condition in which navigation coordinates derived from a navigational instrument define more than one point, direction, line of position, or surface of position. { ,am·bə'gyü·əd·ē }

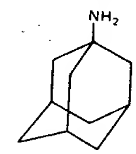
ambiguity error [COMPUT SCI] An error in reading a number represented in a digital display that can occur when this representation is changing; for example, the number 699 changing to 700 might be read as 799 because of imprecise synchronization in the changing of digits. { ,am·bə'gyü·əd·ē ,er·ər }

ambiguous case [MATH] 1. For the solution of a plane triangle, the case in which two sides and the angle opposite one of them is given, and there are two distinct solutions. 2. For the solution of a spherical triangle, the case in which two sides and the angle opposite one of them is given, or two angles and the side opposite one of them is given, and there are two distinct solutions. { am¦big·yə·wəs 'kās }

ambiguous codon [GEN] A codon capable of coding for more than one amino acid sequence. { am'big·yə·wəs 'kō,dän }

ambiguous name [COMPUT SCI] A name of a file or other item which is only partially specified; it is useful in conducting a search of all the items to which it might apply. { am'big·yə·wəs 'nām }

AMANTADINE



Structural formula of amantadine.

ANSI/IEEE Std 100-1984
Third Edition

IEEE Standard Dictionary of Electrical and Electronics Terms

Frank Jay
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amateur band (overhead-power-line corona and radio noise). Any one of several frequency groups assigned for the transmission of signals by amateur radio operators. 411

ambient air temperature (1) (metal enclosed bus) (relaying). The temperature of the surrounding air which comes in contact with equipment. *Note:* Ambient air temperature, as applied to enclosed bus or switchgear assemblies, is the average temperature of the surrounding air that comes in contact with the enclosure. 78, 79
(2) (power switchgear). The temperature of the surrounding air which comes in contact with equipment. *Note:* Ambient air temperature, as applied to enclosed switchgear assemblies, is the average temperature of the surrounding air that comes in contact with the enclosure. 103

ambient background (sodium iodide detector). Those counts that can be observed, and thereby allowed for, by measuring a source that is identical to the unknown source in all respects except for the absence of radioactivity. These counts are attributable to environmental radioactivity in the detector itself, the detector shielding material, and the sample container; cosmic rays; electronic noise pulses; etcetera. 423

ambient conditions. Characteristics of the environment, for example, temperature, humidity, pressure. *See:* **measurement system.** 185, 54

ambient level (1) electromagnetic compatibility). The values of radiated and conducted signal and noise existing at a specified test location and time when the test sample is not activated. *See* **electromagnetic compatibility.** 197
(2) (radio-noise emission). The levels of a radiated and conducted signal and noise existing at a specific test location and time when the test sample is not activated. 418

ambient noise (1) (room noise). Acoustic noise existing in a room or other location. Magnitudes of ambient noise are usually measured with a sound level meter. *Note:* The term room noise is commonly used to designate ambient noise at a telephone station.*See:* **circuit noise; circuit noise level; line noise.** 59
(2) (mobile communication). The average radio noise power in a given location that is the integrated sum of atmospheric, galactic, and man-made noise. *See:* **telephone station.** 181

ambient operating-temperature range (power supply). The range of environmental temperatures in which a power supply can be safely operated. For units with forced-air cooling, the temperature is measured at the air intake. *See:* **power supply.** 228, 186

ambient radio noise. *See:* **ambient level.**

ambient temperature (1) (general). The temperature of the medium such as air, water, or earth into which the heat of the equipment is dissipated. *Notes:* (A) For self-ventilated equipment,the ambient temperature is the average temperature of the air in the immediate neighborhood of the equipment. (B) For air- or gas-cooled equipment with forced ventilation or secondary water cooling, the ambient temperature is taken as that of the ingoing air or cooling gas. (C) For self-ventilated enclosed (including oil-immersed) equipment considered as a complete unit, the ambient temperature is the average temperature of the air outside of the enclosure in the imme-diate neighborhood of the equipment. 225, 206, 124, 2, 91
(2) (outdoor apparatus bushing). The temperature of the surrounding air that comes in contact with the device or equipment in which the bushing is mounted. 168
(3) (light emitting diode) (free air temperature) (Ta). The air temperature measured below a device, in an environment of substantially uniform temperature, cooled only by natural air convention and not materially affected by reflective and radiant surfaces. 162
(4) (nuclear power generating stations). The average of air temperature readings at several locations in the immediate neighborhood of the equipment. 440
(5) (packaging machinery). The temperature of the surrounding cooling medium, such as gas or liquid, that comes into contact with the heated parts of the apparatus. 429
(6) (power and distribution transformer). The temperature of the medium such as air, water, or earth into which the heat of the equipment is dissipated. *Notes:* (1) For self-ventilated equipment, the ambient temperature is the average temperature of the air in the immediate neighborhood of the equipment. (2) For air or gas-cooled equipment with forced ventilation or secondary water cooling, the ambient temperature is taken as that of the ingoing air or cooling gas. (3) For self-ventilated enclosed (including oil-immersed) equipment considered as a complete unit, the ambient temperature is the average temperature of the air outside of the enclosure in the immediate neighborhood of the equipment. 53
(7) (power switchgear). The temperature of the surrounding medium that comes in contact with the device or equipment. 103, 443
(8) (shunt power capacitor). The temperature of the medium such as air, water, or earth into which the heat of the equipment is dissipated. *Notes:* (1) For self-ventilated equipment, the ambient temperature is the average temperature of the air in the immediate neighborhood of the equipment. (2) For air or gas cooled equipment with forced ventilation or secondary water cooling, the ambient temperature is taken as that of the ingoing air or cooling gas. (3) For self-ventilated enclosed (including oil-immersed) equipment considered as a complete unit, the ambient temperature is the average temperature of the air outside of the enclosure in the immediate neighborhood of the equipment. 138

ambient temperature rating at quarter-rated thermal burden. Maximum ambient temperature at which a potential transformer can be operated without exceeding the specified temperature limitations,when operated at a rated voltage and frequency while supplying 25 percent of the rated thermal burden. 203

ambient temperature time constant. At a constant operating resistance, the time required for the change in (bolometer unit)bias power to reach 63 percent of